

## MILITARY SPECIFICATION

### CONNECTORS, ELECTRICAL JACKS, TIP (TEST POINT, PANEL OR PRINTED WIRING TYPE), GENERAL SPECIFICATION FOR

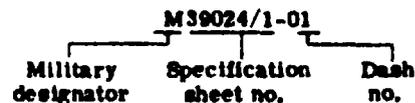
This specification is approved for use by all Departments and Agencies of the Department of Defense.

#### 1 SCOPE

1.1 Scope. This specification covers the general requirements for panel or printed wiring type test point connectors for use in electrical and electronic equipment. (See 6.1.) As used in this specification, the term "connectors" shall include tip jacks.

1.2 Classification. Connectors covered by this specification shall be single-contact or multiple-contact connectors, as specified (see 3.1).

1.2.1 Military part number. The military part number shall consist of the letter "M", the basic number of the specification sheet, and an assigned dash number (see 3.1), as shown in the following



#### 2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### FEDERAL

- L-P-410 - Plastic, Polyamide (Nylon), Rigid. Rods, Tubes, Flats, Molded and Cast Parts.
- QQ-B-828 - Brass, Leaded and Nonleaded Rod, Shaped, Forgings, and Flat Products with Finished Edges (Bar and Strip).
- QQ-B-750 - Bronze, Phosphor, Bar, Plate, Rod, Sheet, Strip, Flat Wire, and Structural and Special Shaped Sections.
- QQ-C-530 - Copper-Beryllium Alloy Bar, Rod, and Wire (Copper Alloy Number 172).
- QQ-C-533 - Copper-Beryllium Alloy Strip (Copper Alloy Numbers 170 and 172).
- QQ-N-290 - Nickel Plating (Electrodeposited).
- QQ-P-35 - Passivation Treatments for Austenitic, Ferritic, and Martensitic Corrosion-Resisting Steel (Fastening Devices).

##### MILITARY

- MIL-M-14 - Molding Plastics and Molded Plastic Parts, Thermosetting.
- MIL-T-10727 - Tin Plating, Electrodeposited or Hot-Dipped, for Ferrous and Nonferrous Metals.
- MIL-C-14550 - Copper Plating, (Electrodeposited).
- MIL-W-16878 - Wire, Electrical, Insulated, High Temperature.
- MIL-I-17214 - Indicator, Permeability, Low-Mu (Go - No Go).
- MIL-P-19468 - Plastic Rods, Polytetrafluoroethylene, Molded and Extruded.
- MIL-P-19833 - Plastic Molding Material and Plastic Molded Parts, Glass Fiber Filled, Diallyl Phthalate Resin.
- MIL-G-45204 - Gold Plating, Electrodeposited
- MIL-C-45662 - Calibration System Requirements.
- MIL-C-55330 - Connectors, Preparation for Delivery of

FSC 5935

MIL-C-39024A

(See Supplement 1 for list of associated specification sheets.)

## STANDARDS

### FEDERAL

Fed. Test Method Std 406 - Plastic, Methods of Testing.  
FED-STD-595 - Colors

### MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.  
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.  
MIL-STD-275 - Printed Wiring for Electronic Equipment.  
MIL-STD-889 - Dissimilar Metals.  
MIL-STD-1285 - Marking of Electrical and Electronic Parts.  
MIL-STD-1344 - Test Methods for Electrical Connectors

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

### NATIONAL BUREAU OF STANDARDS

Handbook H28 - Screw Thread Standards for Federal Services

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

## 3 REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheets, the latter shall govern.

3.2 Qualification. Connectors furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.3).

3.3 Materials. Materials shall be as specified herein, however, when a definite material is not specified, a material shall be used which will enable the connectors to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

### 3.3.1 Metal parts.

3.3.1.1 Nonmagnetic materials. All parts shall be made from materials which are classed as nonmagnetic.

3.3.1.2 Dissimilar metals. Where dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided. Dissimilar metals shall be as defined in MIL-STD-889. Dissimilar metals such as brass, copper, or steel (except corrosion-resisting steel, passivated in accordance with QQ-P-35) shall not be used in intimate contact with aluminum or aluminum alloy.

**3.3.1.3 Metals and finishes.** All exposed metal parts, except electric contacts, terminals, and corrosion-resisting steel parts shall be nickel-plated in accordance with class 1, type 2, of QQ-N-290. Steel parts shall be passivated in accordance with QQ-P-35.

**3.3.1.4 Contacts.** Contacts and contact tabs shall be made of copper-beryllium in accordance with QQ-C-530 or QQ-C-533, or (when specified, see 3.1) phosphor bronze per QQ-B-750. Contacts shall be gold plated in accordance with type II, grade C, class 1 of MIL-G-45204. Silver underplate shall not be used.

**3.3.1.5 Terminals.** Soldering terminals shall be made of a copper alloy material, and shall be gold plated in accordance with type II, grade C, of MIL-G-45204 with an 0.0002-inch minimum thickness underplate of either copper, class 3 of MIL-C-14550, or nickel, or shall be tin plated in accordance with type I of MIL-T-10727, 0.0004-inch thick with an 0.0002-inch minimum thickness underplate of copper in accordance with class 3 of MIL-C-14550. Silver underplate shall not be used.

**3.3.2 Plastic parts.** Plastic parts shall be made of type GDI-30F of MIL-P-19833 or type SDG-F of MIL-M-14, or, when specified (see 3.1), L-P-410 or MIL-P-19468. When applicable, insulation colors shall conform to FED-STD-595, as specified (see 3.1).

**3.3.2.1 Flammability.** Plastic materials shall be limited to those certified by their manufacturers as self-extinguishing in accordance with method 2021, 2022, or 2023 of Federal Test Method Standard 408.

**3.3.3 Threaded parts.** Screw threads for threaded parts shall conform to Handbook H28, and shall be as specified (see 3.1).

**3.4 Design, construction, and physical dimensions.** Connectors shall be of the design, construction, and physical dimensions specified (see 3.1). Unless otherwise specified (see 3.1), connectors shall have an operating temperature range of -65°C to +125°C.

**3.4.1 Contacts.** Contacts shall be of closed-entry design. The closed-entry feature shall be an integral part of the socket contact. The socket contact shall provide the spring action for maintaining the contact pressure between the test probe and socket. Contacts shall accept test probes 0.040 ±0.001 or 0.080 ±0.001 inch in diameter, as specified (see 3.1).

**3.4.1.1 Contact identification.** Contact positions on multiple-contact connectors shall be permanently identified by legible letters or numerals, as specified (see 3.1), molded or stamped on the front and rear face of the connector body. Marking shall be arranged to avoid confusion between contacts.

**3.4.1.2 Contact arrangement.** The center-to-center distance between contacts shall be as specified (see 3.1).

**3.4.1.3 Contact finish.** Contact finish shall be smooth, free of shear lines, tear out or scratches, and shall show no signs of porosity or surface cracks.

**3.4.1.4 Contact current rating.** The current rating of contacts shall be as shown in table I, as specified (see 3.1).

TABLE I. Contact current rating.

Contact diameter Inch	Current rating (maximum) amperes
0.040	3
0.080	5

3.4.2 Mounting hardware Screws, clamps, brackets, or similar means for mounting the connectors shall be furnished, when specified (see 3.1)

3.5 Performance.

3.5.1 Permeability. When connectors are tested as specified in 4.6.3, the permeability shall be less than 2.0 Mu.

3.5.2 Contact resistance When connectors are tested as specified in 4.6.4, the voltage drop shall be not greater than 20 millivolts, unless otherwise specified (see 3.1).

3.5.3 Insulation resistance. When measured as specified in 4.6.5, the insulation resistance shall be 5,000 megohms or greater

3.5.4 Dielectric withstanding voltage. When tested as specified in 4.6.6, connectors shall withstand the test voltage specified (see 3.1) with no evidence of flashover.

3.5.5 Insertion and withdrawal forces. When connectors are tested as specified in 4.6.7, the forces required to insert and withdraw the test probes (see 4.6.1.1) shall be as specified (see 3.1)

3.5.6 Resistance to test-probe damage. When tested as specified in 4.6.8, socket contacts and connectors shall be capable of withstanding the bending moment and depth of test probe insertion with no visual evidence of physical damage.

3.5.7 Thermal shock When tested as specified in 4.6.9, connectors shall show no visual evidence of physical damage.

3.5.8 Shock (specified pulse) When tested as specified in 4.6.10, connectors shall show no visual evidence of mechanical damage, loosening of parts, rupturing of dielectric materials, or loss of electrical continuity in excess of 10 microseconds.

3.5.9 Vibration When connectors are tested as specified in 4.6.11, there shall be no loss of electrical continuity in excess of 10 microseconds during the test. After the test, connectors shall meet the following requirements

- Visual examination - - - - - There shall be no cracking, breaking, or loosening of parts or other evidence of physical damage
- Insertion and withdrawal forces - - - - - Shall be as specified in 3.5.5
- Contact resistance - - - - - Shall be as specified in 3.5.2, unless otherwise specified (see 3.1)

3.5.10 Humidity (steady state) When tested as specified in 4.6.12, connectors shall show no visual evidence of physical damage and the insulation resistance shall exceed 1,000 megohms.

3.5.11 Salt spray (corrosion). When connectors are tested as specified in 4.6.13, there shall be no exposure of the basis metal. After the test, the contact resistance shall be as specified in 3.5.2, unless otherwise specified (see 3.1)

3.5.12 Durability When tested as specified in 4.6.14, connectors shall show no visual evidence of electrical or mechanical damage and shall meet the following requirements

- Insertion and withdrawal forces - - - - - Shall be as specified in 3.5.5.
- Contact resistance - - - - - Shall be as specified in 3.5.2, unless otherwise specified (see 3.1).

**3.6 Identification marking.** Connectors shall be marked in accordance with method I of MIL-STD-1205, with the complete part number, manufacturer's name or trademark, and, when specified (see 3.1), the date and source code. Marking shall be located on the connector so that it will be visible after installation, unless this is impossible because of space limitations. In such cases, required marking shall be applied to an envelope, bag, box, or other intermediate container suitable for shelf storage.

**3.7 Workmanship** Connectors shall be processed in such a manner as to be uniform in quality and shall be free from pits, cracks, rough edges, and other defects that will affect life, serviceability, or appearance.

#### 4. QUALITY ASSURANCE PROVISIONS

**4.1 Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

**4.1.1 Test equipment and inspection facilities.** Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the supplier. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-C-45662.

**4.2 Classification of inspections.** The inspections specified herein are classified as follows.

- (a) Qualification inspection (see 4.4).
- (b) Quality conformance inspection (see 4.5).

**4.3 Inspection conditions.** Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-1344.

**4.4 Qualification inspection.** Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production.

**4.4.1 Sample size.** Eighteen connectors of each type, size, and terminal style (if applicable) shall be subjected to qualification inspection.

**4.4.2 Inspection routine.** The sample shall be subjected to the inspections specified in table II, in the order shown. All sample units shall be subjected to the inspections of group I. The sample shall then be divided equally into three groups of six units each, and subjected to the inspections for their particular group.

**4.4.3 Failures.** One or more failures shall be cause for refusal to grant qualification approval.

**4.4.4 Retention of qualification.** To retain qualification, the supplier shall forward a report at 36-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of:

- (a) A summary of the results of the tests performed for inspection of product for delivery (groups A and B), indicating as a minimum the number of lots that have passed and the number that have failed. The results of tests of all reworked lots shall be identified and accounted for.

(b) A summary of the results of tests performed for periodic check test (group C), including the number and mode of failures. The summary shall include results of all periodic check tests performed and completed during the first 24-month period with subsequent reporting periods of 36 months. If the summary of the test results indicates nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list.

Failure to submit the report within 30 days after the end of each 36-month period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the supplier shall immediately notify the qualifying activity at any time during the 36-month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during two consecutive periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit the product to testing in accordance with the qualification inspection requirements.

TABLE II. Qualification inspection.

Examination or test	Requirement paragraph	Test paragraph
<u>Group I (all specimens)</u>		
Visual and mechanical examination - - - - -	3.1, 3.3, 3.4, 3.6, and 3.7	4.6.2
Permeability - - - - -	3.5.1	4.6.3
<u>Group II (6 specimens)</u>		
Contact resistance - - - - -	3.5.2	4.6.4
Insulation resistance - - - - -	3.5.3	4.6.5
Dielectric withstanding voltage - - - - -	3.5.4	4.6.6
Insertion and withdrawal forces - - - - -	3.5.5	4.6.7
Resistance to test-probe damage - - - - -	3.5.6	4.6.8
<u>Group III (6 specimens)</u>		
Thermal shock - - - - -	3.5.7	4.6.9
Shock (specified pulse) - - - - -	3.5.8	4.6.10
Vibration - - - - -	3.5.9	4.6.11
Humidity (steady state) - - - - -	3.5.10	4.6.12
<u>Group IV (6 specimens)</u>		
Salt spray (corrosion) - - - - -	3.5.11	4.6.13
Durability - - - - -	3.5.12	4.6.14

4.4.5 Extension of qualification. Test point connectors of the same type, size, and terminal style (if applicable) shall be qualified for any permissible color other than that tested during qualification inspection, provided that the material, design, construction, and physical dimensions used are identical.

4.5 Quality conformance inspection

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections.

4.5.2 Inspection lot. An inspection lot, as far as practicable, shall consist of all connectors of the same basic type, size, and terminal style (if applicable), produced under essentially the same conditions, and offered for inspection at one time. When a connector has different colors of insulation, an inspection lot may include any quantity and variety of colors provided that the units are otherwise mechanically and dimensionally identical.

4.5.2.1 Group A inspection. Group A inspection shall consist of the examination and test specified in table III, and shall be made on the same set of sample units, in the order shown.

TABLE III. Group A inspection.

Examination or test	Requirement paragraph	Test paragraph	AQL (percent defective)	
			Major	Minor
Visual and mechanical examination - -	3.1, 3.3, 3.4, 3.6, and 3.7	4.6.2	} 1.0	} 4.0
Permeability - - - - -	3.5.1	4.6.3		

4.5.2.1.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table III. Major and minor defects shall be as defined in MIL-STD-105.

4.5.2.1.2 Rejected lots. If an inspection lot is rejected, the supplier may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.5.2.2 Group B inspection. Group B inspection shall consist of the tests specified in table IV, in the order shown, and shall be made on sample units which have been subjected to and have passed group A inspection.

TABLE IV. Group B inspection.

Test	Requirement paragraph	Test paragraph
Contact resistance - - - - -	3.5.2	4.6.4
Insulation resistance - - - - -	3.5.3	4.6.5
Dielectric withstanding voltage - - - - -	3.5.4	4.6.6
Insertion and withdrawal forces - - - - -	3.5.5	4.6.7
Resistance to test-probe damage - - - - -	3.5.6	4.6.8

4.5.2.2.1 Sampling plan. The sampling plan shall be in accordance with MIL-STD-105 for special inspection level S-4. The sample size shall be based on the inspection lot size from which the sample was selected for group A inspection. The AQL shall be 2.5 percent defective.

4.5.2.2.2 Rejected lots. If an inspection lot is rejected, the supplier may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.5.2.2.3 Disposition of sample units. Sample units which have been subjected to group B inspection shall not be delivered on the contract or purchase order.

4.5.3 Periodic check test. Periodic check tests shall consist of group C. Except where the results of these inspections show noncompliance with the applicable requirements (see 4.5.3.1.3), delivery of products which have passed groups A and B inspections shall not be delayed pending the results of these periodic check tests.

4.5.3.1 Group C inspection. Group C inspection shall consist of the tests specified in table V, in the order shown. Group C inspection shall be made on sample units selected from inspection lots which have passed groups A and B inspections.

TABLE V. Group C inspection.

Test	Requirement paragraph	Test paragraph	Number of sample units to be inspected
<u>Subgroup 1</u>			
Thermal shock - - - - -	3.5.7	4.6.9	} 6
Shock (specified pulse) - - - - -	3.5.8	4.6.10	
Vibration - - - - -	3.5.9	4.6.11	
Humidity (steady state) - - - - -	3.5.10	4.6.12	
<u>Subgroup 2</u>			
Salt spray (corrosion) - - - - -	3.5.11	4.6.13	} 2
Durability - - - - -	3.5.12	4.6.14	

4.5.3.1.1 Sampling plan. Eight sample units of the same basic type shall be selected after 18 months (first period); after 2 years (second period), and after 3 years (third period). No failures will be permitted.

4.5.3.1.2 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract or purchase order.

4.5.3.1.3 Noncompliance. If a sample fails to pass group C inspection, the supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, and so forth and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the Government). Groups A and B inspections may be reinstated, however, final acceptance shall be withheld until the group C reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and the corrective action taken shall be furnished to the cognizant inspection activity and the qualifying activity.

4.5.4 Inspection of preparation for delivery. Sample packages and packs and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of MIL-C-55330.

4.6 Methods of examination and test.

4.6.1 Preparation for testing. Connectors shall be mounted to appropriate metal panels or printed wiring boards utilizing specified mounting hardware. For electrical tests, terminals shall be wired or soldered with type E wire of MIL-W-16876 (size as specified, see 3.1) to the appropriate panel or to the printed wiring boards conforming to MIL-STD-375, as appropriate.

4.6.1.1 Electrical test probes. Probes used for test purposes shall be  $0.080 \pm 0.001$  or  $0.040 \pm 0.001$  inch in diameter after plating, as appropriate, and 1/2-inch minimum length, or as specified (see 3.1). Probes shall be brass rod, 1/2 hard, copper alloy number 360, in accordance with QQ-B-628, and nickel plated in accordance with type V (FC), class 2, of QQ-N-290.

4.6.2 Visual and mechanical examination. Connectors shall be examined to verify that the design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see 3.1, 3.3, 3.4, 3.6, and 3.7).

4.6.3 Permeability (see 3.5.1). The permeability of all metal parts shall be measured with an indicator conforming to MIL-I-17214.

4.6.4 Contact resistance (see 3.5.2). Connectors shall be tested in accordance with method 307 of MIL-STD-202. The following details and exception shall apply:

- (a) Method of connection - In accordance with figure 1. Measurements shall be made after the temperature of the wire has stabilized.
- (b) Test current - As specified in table I.
- (c) Points of measurement - Across each mated test probe and connector between the two points indicated "X"—"X" on figure 1.
- (d) Number of activations prior to measurement - Not applicable.
- (e) Number of test activations - Not applicable.
- (f) Number of measurements per activation - Not applicable.

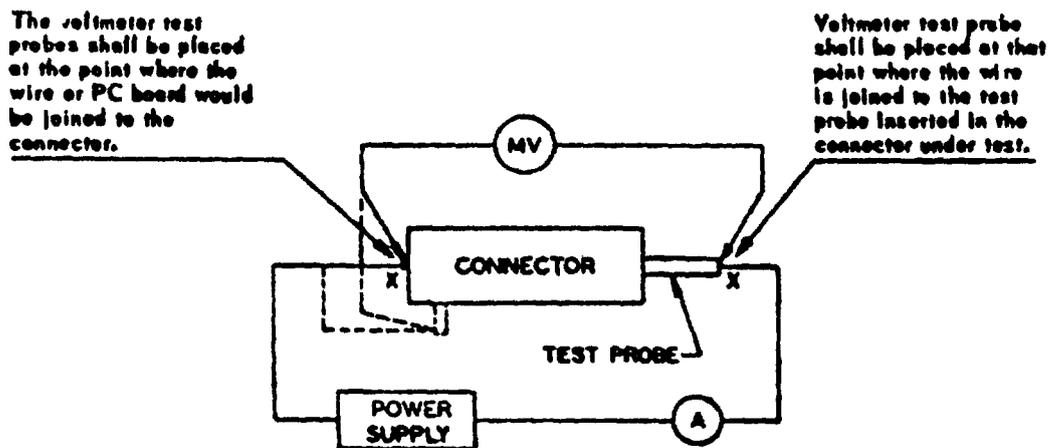
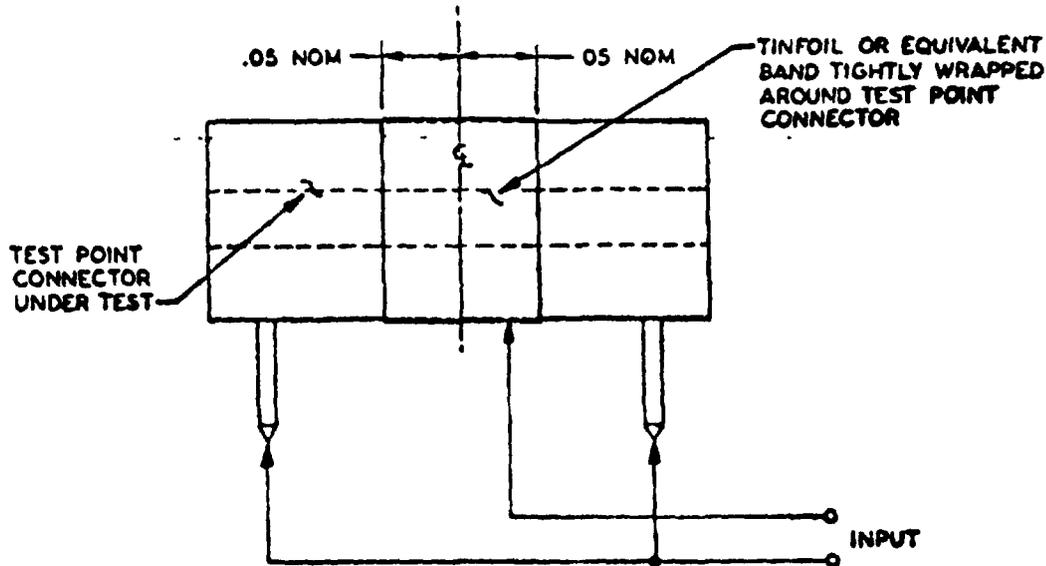


FIGURE 1. Resistance of contacts (potential drop).

4.6.5 Insulation resistance (see 3.5.3). Connectors shall be tested in accordance with method 3003 of MIL-STD-1344 (any number of contacts may be tested simultaneously). The following details and exceptions shall apply:

- (a) Magnitude of test voltage - 100 volts  $\pm 10$  percent. On multiple-contact connectors, the voltage shall be applied between all contacts alternately connected.

- (b) Special conditions - In accordance with figure 2, when specified (see 3.1).
- (c) Points of measurement - Between all contacts and the panel or test mount, and between all adjacent contacts
- (d) Electrification time - Not to exceed 1 minute.
- (e) Test condition letter - A of method 302, MIL-STD-202



**NOTES:**

1. Meters, bridges or other apparatus, when required, shall be incorporated in the circuit.
2. Thickness of the conductive bond (e.g. tinfoil) shall be such that it can withstand the applied voltage.

**FIGURE 2. Test circuit for dielectric withstanding voltage and insulation resistance tests**

**4 6 6 Dielectric withstanding voltage (see 3 5 4)** Connectors shall be tested in accordance with method 3001 of MIL-STD-1344. The following details shall apply:

- (a) Special conditions - In accordance with figure 2, when specified (see 3.1)
- (b) Magnitude of test voltage - As specified (see 3.1)
- (c) Duration of application of test voltage - For a period of 1 minute, unless otherwise specified (see 3.1)
- (d) Points of application of test voltage - Between current-carrying parts and ground, unless otherwise specified (see 3.1). On multiple-contact connectors, the voltage shall be applied between all contacts alternately connected.

**4 6 7 Insertion and withdrawal forces (see 3 5 5)** A test probe conforming to 4 6 1 1 shall be fully inserted three times into the connector socket contact and withdrawn. The test probe shall again be inserted and insertion and withdrawal forces shall be measured.

**4.6.8 Resistance to test-probe damage (see 3.5.6).** A mechanical test probe of hardened steel having a diameter equal to a nominal diameter ( $0.040 \pm .001$  inch or  $0.080 \pm .001$  inch) mating probe shall be inserted into each socket to 1/8-inch, 3/16-inch, and 1/4-inch depths. At each of these depths, measured from the face of the insulator or connector body, a bending moment of 2 inch-pounds  $\pm 10$  percent (.080 test probe) or 1/2 inch-pound  $\pm 10$  percent (.040 test probe) shall be applied to the probe about the inserted end of the probe and the connector shall be rotated in one direction through 360 degrees, in order that a uniform force is applied to the inside surface of the socket. This test shall be performed with the socket contacts in the insulator or connector body, mounted on a printed wiring board or by panel, as applicable, by the normal means, and the sockets locked and soldered to prevent rotation during the test.

In order to insure uniform test results, the test fixture shown on figure 3 shall be used; procedures shall be as follows:

- (a) With the weight in position for the 2 inch-pound or 1/2 inch-pound moment and size 1 spacer on the pin, insert the pin in a socket while the axis of the socket is in a horizontal position. With the fixture free and unsupported, rotate the socket 360 degrees about a horizontal axis, maintaining the socket in a horizontal position.
- (b) Repeat with size 2 spacer.
- (c) Repeat with size 3 spacer.
- (d) For connectors having a maximum insertion depth of 1/8 inch, only the test using the size 1 spacer (4.6.8(a)) is applicable. For connectors having a maximum insertion depth of 3/16 inch, only the tests using sizes 1 and 2 spacers (4.6.8(a) and (b)) are applicable. For connectors having a maximum insertion depth of 1/4 inch, tests using all three spacers are required.

After withdrawal of the fixture, the socket shall be visually examined for evidence of physical damage.

**4.6.9 Thermal shock (see 3.5.7).** Connectors with unwired test probes inserted into contact sockets shall be tested in accordance with method 1003 of MIL-STD-1344. The following details shall apply:

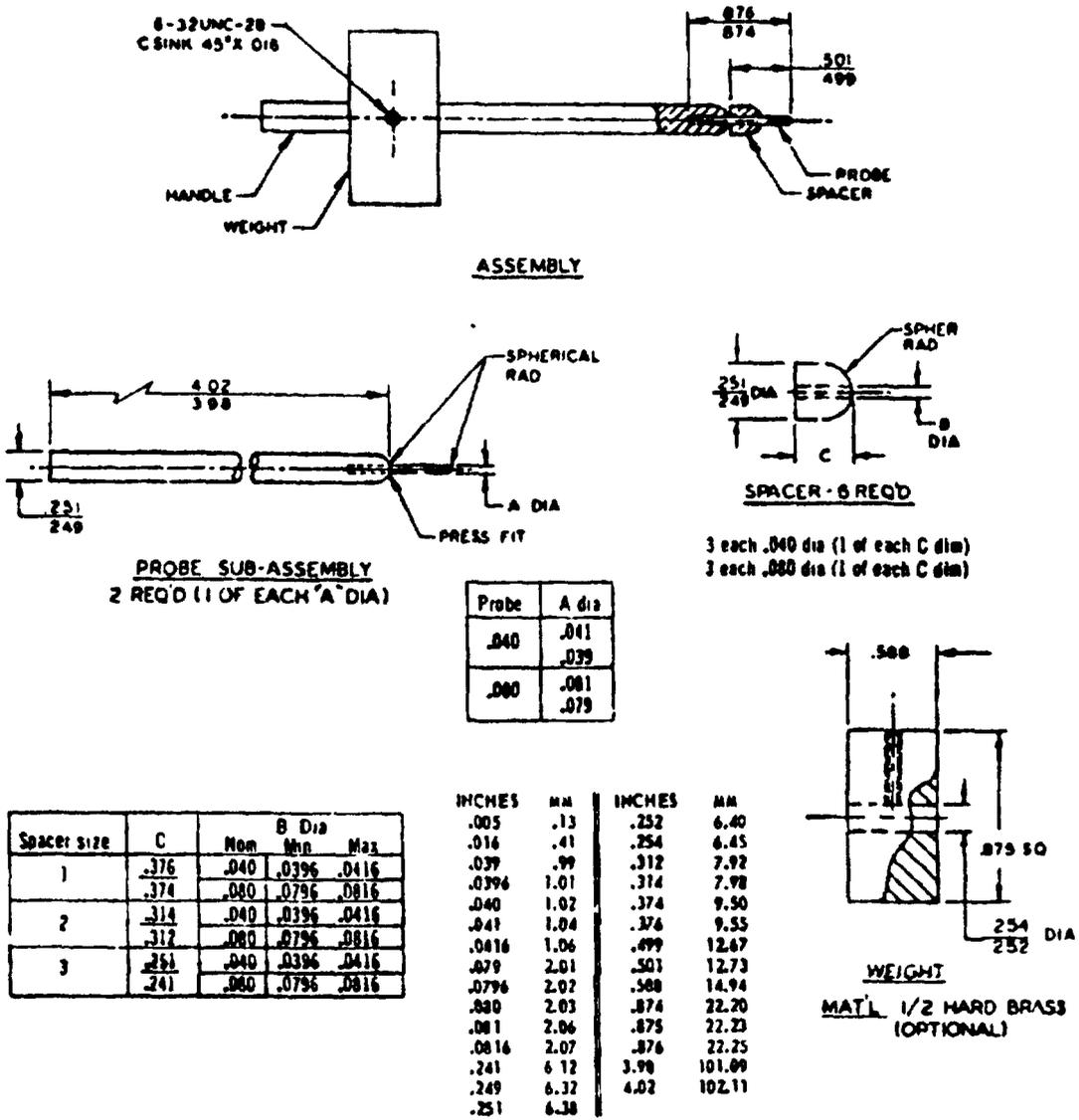
- (a) Test condition letter - B of method 107, MIL-STD-202 (or C, when specified (see 3.1)).
- (b) Examination after test - Connectors shall be visually examined for evidence of physical damage.

**4.6.10 Shock (specified pulse) (see 3.5.8).** Connectors, properly mated, shall be tested in accordance with method 2004 of MIL-STD-1344. The following details and exception shall apply:

- (a) Mounting method - By normal mounting means (see 4.6.1).
- (b) Test condition letter - I of method 213, MIL-STD-202.
- (c) Measurements during shock test - Connectors shall be monitored for electrical continuity both during and after the test. Loss of continuity for a period of longer than 10 microseconds constitutes a failure. All wiring shall be in accordance with 4.6.1.
- (d) When specified (see 3.1), mating probe to be held in position with a retaining nut.

**4.6.11 Vibration (see 3.5.9).** Connectors shall be tested in accordance with method 2005 of MIL-STD-1344. The following details shall apply:

- (a) Test condition number 1.
- (b) Measurement during test - Connectors shall be monitored for electrical continuity during the test. Equipment shall be sufficiently sensitive to detect any interruption with a duration of 10 microseconds.
- (c) Tests after vibration - Insertion and withdrawal and contact resistance shall be measured as specified in 4.6.7 and 4.6.4, respectively.



NOTES

- 1 Dimensions are in inches
- 2 Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
- 3 Unless otherwise specified, tolerance is .XXX ±.005
- 4 Break all sharp edges

FIGURE 3 Test fixture for resistance to test probe damage

4.6.12 Humidity (steady state) (see 3.5.10) Connectors shall be tested in accordance with method 1002 of MIL-STD-1344. The following details shall apply:

- (a) Test-condition letter - B of method 103 MIL-STD-202
- (b) Final measurements - Insulation resistance shall be measured as specified in 4.6.5.

4.6.13 Salt spray (corrosion) (see 3.5.11) Connectors shall be tested in accordance with method 1001 of MIL-STD-1344. The following details shall apply:

- (a) Test-condition letter - B of method 101, MIL-STD-202.
- (b) Measurements after exposure - Immediately after exposure, connectors shall be washed with tap water and allowed to dry for 6 hours maximum in a circulating air oven at a temperature of  $38^{\circ} \pm 3^{\circ}\text{C}$ . After drying, contact resistance shall be measured as specified in 4.6.4.

4.6.14 Durability (see 3.5.12) A test probe conforming to 4.6.1.1 shall be fully inserted into the connector socket contacts and withdrawn for a total of 500 insertion-withdrawal cycles, except as specified (see 3.1), at a rate not to exceed 100 cycles per hour. After the test, insertion and withdrawal and contact resistance shall be measured as specified in 4.6.7 and 4.6.4, respectively.

## 5 PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurements. Preparation for delivery requirements of referenced documents listed in Section 2 do not apply unless specifically stated in the contract or order. Preparation for delivery requirements for products procured by contractors shall be specified in the individual order.)

5.1 Preparation for delivery shall be in accordance with the requirements of MIL-C-55330.

## 6 NOTES

6.1 Intended use The test point connectors covered by this specification are primarily for use in airborne, ground support, and shipboard electrical and electronic equipment.

6.2 Ordering data Procurement document should specify the following:

- (a) Title, number, and date of this specification
- (b) Title, number, and date of the application specification sheet, and the complete part number
- (c) Levels of preservation, packaging and packing, and applicable marking (see section 5)

6.3 Qualification With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list, whether or not such products have been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Naval Electronic Systems Command, Department of the Navy, Washington, D.C., 20360, however, information pertaining to qualification of products may be obtained from either the Naval Electronic Systems Command or the Defense Electronics Supply Center (DESC-E), 1507 Wilmington Pike, Dayton, Ohio 45444.

6.3.1 Copies of Provisions Governing Qualification SD-6 may be obtained from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

**6.4 Group C inspection** Approval to ship may be withheld, at the discretion of the Government, pending the decision from the contracting officer on the adequacy of corrective action. (See 4.5.3.1.3.)

**6.5 Verification inspection** Verification by the Government will be limited to the amount deemed necessary to determine compliance with the contract and will be limited in severity to the definitive quality assurance provisions established in this specification and the contract. The amount of verification inspection by the Government will be adjusted to make maximum utilization of the contractor's quality control system and the quality history of the product, and will normally be identified by the categories listed below:

- (a) **Type A** - The total of that inspection set forth in the quality assurance provisions of this specification or the contract. Included in this category is that amount of inspection referred to as normal and tightened inspection by MIL-STD-105.
- (b) **Type B** - That inspection set forth in the quality assurance provisions of this specification or the contract reduced in amount under the reduced inspection provisions of MIL-STD-105.
- (c) **Type C** - A reduced inspection procedure resulting in a material reduction in the amount of inspection set forth in the quality assurance provisions of this specification. The amount of inspection is less than that provided for in type B and is based upon a consistently acceptable product resulting from a planned quality control system voluntarily employed by the contractor in the production of the product.

**Custodians:**

Army - EL  
Navy - EC  
Air Force - 80

**Preparing activity:**

Navy - EC

**Agent:**

DSA - ES

**Review activities:**

Army - EL, ME, SL  
Navy - EC  
Air Force - 11, 17, 80  
DSA - ES

(Project 5935-1812)

**User activities:**

Army - MI, MU, WC  
Navy - AS, YD, MC, CG, OS, SH  
Air Force - 14, 19